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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/567,882
Filing Date: February 08, 2006
Appellant(s): HOFFMANN ET AL.

Mark Garscia
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 04/07/2011 appealing from the Office action mailed 09/22/2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after Final Rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct. It is noted that the rejection of claim 28 was an editorial error.

(7) Claims Appendix

The copy of appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

7,051,986	Taubmann et al.	12-2006
WO9951456A1	Taubmann et al.	10-1999

2,128,483	Hendrick	8-1938
3,812,737	Campbell et al.	5-1974
4,386,893	Hauser, Jr.	6-1983
5,893,959	Muellich	8-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-5, 7, 8, 12, 15-27, 29-32, 34, 36, 37, 82-87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taubmann et al. (WO9951456A1; using USP 7051986 as a translation of the PCT reference for discussing the rejection) in view of Hendrick (USP 2128483) and further in view of Campbell et al. (USP 3812737).

Examiner notes that the exact location of the discussed reference numerals or column and line numbers may not exactly correspond with the exact location in PCT document.

Regarding claim 1, Taubmann et al. discloses an adjustable mechanism (see title) comprising a spindle nut (fig.4, 92) interacting on one side with a threaded spindle (fig.1, 5) and interacting with a further gearing element (fig.4, 91) and wherein the spindle nut has an opening with an internal surface (fig.4, inner opening with the internal surface), said internal surface comprising an internal tothing (fig.4, not explicitly shown but since in the specification element 5 is a threaded spindle, the internal surface of 92 has to be threaded, at the very least, as acknowledged by the applicant it would have to be internally threaded along the middle section of the spindle nut 92'. Even if the internal threads do not extend to the bearing collars.) through which the spindle nut interacts with the threaded spindle.

Taubmann et al. fails to explicitly disclose the external toothing of the spindle nut is formed through radially inwardly pointing indentations in the external surface of the spindle nut such that a crest of each tooth is defined by a portion of the external surface of the spindle nut and wherein tooth depth diminishes towards at least one axial end of the spindle nut and at least one side of the external toothing having an end section without external toothing, and wherein an outer diameter of the crest is less than or equal to an outer diameter of the end section and wherein the external toothing comprises, in the axial direction, two axial edge regions and a center region having different toothing shapes, wherein the external toothing is globoid in shape in said axial edge regions with a tooth depth continuously reducing towards the axial ends of the external toothing, and wherein the center region has a cylindrical portion with an involute profile in the axial direction.

Hendrick teaches a spindle nut or worm wheel (fig.5 and fig. 6, element 47 and 51) wherein the external toothing of the spindle nut is formed through radially inwardly pointing indentations in the external surface of the spindle nut such that a crest of each tooth (see fig.5) is defined by a portion of the external surface of the spindle nut and wherein tooth depth diminishes towards at least one axial end of the spindle nut (see fig.5) with at least one side of the external toothing having an end section without external toothing (both sides have end sections without external toothing), and wherein an outer diameter of the crest is less than or equal to an outer diameter of the end section (as seen in figs. 5 and 6, the outer diameter of the crest is less than or equal to the outer diameter of the end sections); wherein the external toothing comprises, in the

Art Unit: 3656

axial direction, two axial edge regions and a center region having different toothing shapes (see fig.5), wherein the external toothing is globoid in shape (the axial edge regions of this toothing is globoid in shape) in said axial edge regions with a tooth depth continuously reducing towards the axial ends of the external toothing, and for the purpose of providing gear teeth with longer bearing surfaces and decreasing backlash between the worm and the spindle nut (page 2, col.1, lines 53-61).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the spindle nut (in particular the nut portion 92', not including the collars) disclosed by Taubmann et al. to include the gear teeth taught by Hendrick in order to provide a spindle nut with longer bearing surfaces and decreasing backlash between the worm and the spindle nut (page 2, col.1, lines 53-61). This would improve the meshing engagement between the nut and the worm and improve the accuracy and durability of the seat adjusting mechanism.

As a result of the combination made above, Taubmann et al. discloses the internal toothing of the spindle nut interacting with the threaded spindle would extend over a greater length in the axial direction than the external toothing of the spindle nut so that the internal toothing extends axially into the at least one end section without external toothing (since the internal toothing disclosed by Taubmann et al. extends at least through the middle section 92', in other words not including the collars, then as a result modifying the external surface of 92', the internal teeth would have to extend at least into the end sections without external toothing which would be part of the external surface 92'.)

Taubmann et al. in view of Hendrick fails to explicitly disclose wherein the center region [of the toothing] has a cylindrical portion with an involute profile in the axial direction.

Campbell et al. teaches a particular tooth profile in fig.4 for a worm wheel which has a center region [of the toothing] which has a cylindrical portion with an involute profile in the axial direction (46, 48 is cylindrical portion and depressed relative to the first tooth crowns). The particular tooth profile is used for predictable purpose of reducing noise and backlash between the worm and worm wheel and for allowing for teeth of the drive worm to engage with the worm wheel which provides a stronger meshing engagement. It is also old and well-known to use such a design in worm type gears as noted by Campbell et al. in col.3, lines 56+ to col.4, lines 1 and 2.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the gear teeth disclosed by Taubmann in view of Hendrick by including the specific toothing profile as taught by Landskron et al., for predictable purpose of reducing noise and backlash between the worm and worm wheel and for allowing for teeth of the drive worm to engage with the worm wheel which provides a stronger meshing engagement. It is also old and well-known to use such a design in worm type gears as noted by Campbell et al. in col.3, lines 56+ to col.4, lines 1 and 2.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taubmann et al. (WO9951456A1; using USP 7051986 as a translation of the PCT reference for discussing the rejection) in view of Hendrick (USP 2128483) and further in

Art Unit: 3656

view of Campbell et al. (USP 3812737), as applied to claim 1 above, and further in view of Hauser, Jr. (USP 4386893).

Regarding claim 14, the combination of Taubmann et al. and Hendrick and Campbell et al. is silent to the tooth thickness of the internal toothing of the spindle nut interacting with the threaded spindle being greater than the gap between each tooth.

Hauser, Jr. teaches using a tooth thickness that is greater than the gap between the meshing teeth (see fig.1) for the purpose of increasing bearing surface and thus increasing lubrication of a fluid film (see claim 1).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to change the shape of the internal toothing taught by Taubmann et al. to be thicker than the gap between the internal toothing and the threaded spindle in order to provide the predictable results of increasing the bearing surface. Furthermore, if a lubricant were added to the interface, the bearing would have more lubricating surface.

(10) Response to Arguments

Regarding claim 1

Appellant argues that Hendrick is directed to a totally different field and to a totally different application, in other words, Appellant appears to be arguing that Hendrick is non-analogous art.

In response to applicant's argument that Hendrick is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the appellant

Art Unit: 3656

was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Hendrick relates to a gearing connection between a work and a worm wheel which is analogous to Applicant's gearing connection and therefore could be considered to be within the same field of endeavor and/or reasonably pertinent to the particular problem (optimizing a gearing connection) with which the Applicant was concerned.

Appellant further argues that Hendrick would not work with Taubmann in light of particular structure in Hendrick which is not relied upon in the rejection. It appears Appellant is making a piecemeal analysis of Hendrick and a bodily incorporation argument.

In response to this argument it is noted that the test of obviousness is not whether the features of one reference can be bodily incorporated into the structure of another and proper inquiry should not be limited to the specific structure shown by the references, but should be into the concepts fairly contained therein, and the overriding question to be determined is whether those concepts would suggest to one skilled in the art the modifications called for by the claims. See *In re Henley*, 112 USPQ 56 (CCPA 1956). In the instant, case Hendrick teaches the concept of using a particular toothing design on the worm wheel and such a concept is being applied to Taubmann.

Appellant argues that Taubmann in view of Hendrick fail to disclose that the internal toothing "extends over a greater length in the axial direction than the external toothing of the spindle nut so that the internal toothing extends axially into the at least one end section without external toothing".

In response to this argument, as acknowledged by applicant in the response dated 06/09/2009, page 20, the internal tothing in Hendrick would have to be internally threaded along the middle section of the spindle nut 92' (between the shoulders). Therefore, as a result of the combination made above, since the internal tothing disclosed by Taubmann et al. extends at least through the middle section 92', in other words not including the collars, then as a result modifying the external surface of 92', the internal teeth would have to extend at least into the end sections without external tothing which would be part of the external surface 92'.

Appellant argues that the combined references fail to disclose "the external tothing comprises, in the axial direction, two axial edge regions and a center region having different tothing shapes, wherein the external tothing is globoid in shape in said axial edge regions with a tooth depth continuously reducing towards the axial ends of the external tothing, and wherein the center region has a cylindrical portion with an involute profile in the axial direction."

In response to this argument, the combination of references, as noted in the above rejection, disclose the claimed limitations. In particular, Hendrick discloses both a globoid axial edge region tooth shape and a cylindrical portion in a center region given its broadest and most reasonable interpretation. However, Campbell was used as a teaching to teach the use of an involute profile in the center region as noted above but also teaches a cylindrical portion in the center region. Appellant has not explicitly defined what is meant by globoid and a cylindrical portion in the specification and the figure relied upon in the arguments is not part of the specification as originally disclosed.

Art Unit: 3656

Furthermore, a cylindrical portion does not imply a flat section since cylinders have rounded sections and flat sections depending on which cross-section is being viewed.

Regarding claim 14

Appellant argues that Hauser is not relevant to a spindle nut/threaded spindle arrangement and in other words is non-analogous art.

In response to appellant's argument that Hauser is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Hauser relates to a toothing connection between two toothed members which is analogous to Appellant's toothing connection and therefore could be considered to be within the same field of endeavor and/or reasonably pertinent to the particular problem (optimizing a toothing connection) with which the Appellant was concerned.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Thomas Diaz/

Examiner, Art Unit 3656

Conferees:

Brian K. Green /BKG/

/RICHARD WL RIDLEY/

Supervisory Patent Examiner, Art Unit 3656